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ABSTRACT

In 1986-87, the Austin (Texas) Independent School District converted from a full-day prekindergarten program for low-achieving children to a half-day program to serve more limited-English-proficient (LEP) and low-income children (thereby meeting eligibility criteria in conformance with Texas House Bill 72). Half-day instructional time was 60% of that provided in full-day sessions, and with teaching staff increases, three times as many children (1,516) were served as in 1985-86 (494), including more bilingual and English as a Second Language (ESL) classes. Pretest-posttest gains on the Peabody Picture Vocabulary Test-Revised evaluated half-day and full-day program effectiveness, measured against national average gains. Results showed that: (1) half-day program gains in English vocabulary were generally two-thirds those of the full-day program; (2) the greater gains of full-day LEP students occurred at all achievement levels, but the difference appeared to be associated more with teacher experience than with amount of instructional time; (3) for non-LEP students, the difference was greatest for lower achieving students and tended to disappear for students scoring greater than about 80 at pretest; (4) there was little if any difference in the achievement gains of students in morning or afternoon classes; and (5) half-day classes may lead to somewhat lower attendance rates. (LPG)

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PREKINDERGARTEN: FULL DAY VS. HALF DAY
EXECUTIVE SUMMARY

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Since the mid-seventies, the District has had full-day prekindergarten classes for low-achieving children. House Bill 72 provided for half-day prekindergarten for limited-English-proficient (LEP) and low-income children. The District served children with a full-day program in 1985-1986 with half paid State and local funds and half from Chapter 1 federal funds. To serve as many prekindergarten children as possible in 1986-1987, the number of classes was increased, class time was shortened to half a day, and the eligibility criteria were brought in line with H.B. 72. The District also funded the Prekindergarten Program entirely from State and local monies. These changes increased prekindergarten enrollment to 1,516 children in 84 half-day classes compared to 494 children in 25 full-day classes during 1985-1986.

This report summarizes the evaluation findings for the Prekindergarten Program with comparisons of achievement gains made by students in the last two years.

MAJOR FINDINGS

1. More than three times the number of students were served this year, and the number of bilingual classes increased from 6 to 34.

2. AISD's Prekindergarten Program continues to produce gains in vocabulary development which exceed the national average.

3. Even though the school day was only half as long, students received 60% of the instructional time of the full-day program.

4. With only 60% of the instructional time of the full-day program, the gains for this year's program were about two-thirds those of last year's program--11.4 vs 15.5 standard score points for Limited-English-Proficient (LEP) students and 10.8 vs 15.8 points for non-LEP students.

5. Unless the AISD curriculum is made more challenging to average achievers, there appears to be no advantage to full-day pre-K for these students.

6. Half-day classes may lead to somewhat lower attendance rates; furthermore, students were enrolled 15 fewer days on the average this year.

7. In conclusion, students do learn less in a half-day program, but more than half as much and the benefit is that many more students were served.

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HISTORY OF AISD PREKINDERGARTEN PROGRAM

NOTES: Half-day classes begin in the 1986-1987 school year; prior years were full-day classes. In 1985-1986, morning session was funded by State and local funds; afternoon session funded by Chapter 1/Migrant. Beginning in 1986-1987, the Prekindergarten Program was funded totally from State and local monies.

PREKINDERGARTEN: FULL DAY VS. HALF DAY
FINAL REPORT

Since the mid-seventies, the District has had full-day prekindergarten classes for low-achieving children funded by federal funds. House Bill 72 provided for half-day prekindergarten for limited-English-proficient (LEP) and low-income children. Using State and local funds for prekindergarten for the first time, the District served children with a full-day program in 1985-1986 with half paid from Chapter 1 federal funds. To serve as many prekindergarten children as possible in 1986-1987, the number of classes was increased, class-time shortened to half-a-day, and the eligibility criteria were brought into line with H.B. 72. The District also funded the prekindergarten program entirely from local monies.

This year's Prekindergarten Program evaluation focuses on the following:

- documenting how many students were served by AISD's Prekindergarten Program, and
- measuring achievement gains made on the Peabody Picture Vocabulary Test-Revised (PPVT-R) by various groups of children enrolled in the program last year and this year.

HOW IS THIS YEAR'S PREKINDERGARTEN PROGRAM DIFFERENT?

Instructional Time

- This year's instructional time per student represents about 60% of what was delivered last year. Although a half-day class is three hours long compared to seven hours in a full-day program, the half day program schedule provides more than half of the instructional time of a full-day program.

Expanded Enrollment, Number of Classes, and Number of Teachers

- More than three times the number of children were enrolled this year.

FIGURE 1
THE PREKINDERGARTEN PROGRAM IN 1985-1986 AND 1986-1987

	SCHOOL YEAR		
	1985-1986	1986-1987	DIFFERENCE
Student Enrollment	494	1,516	1,022
Teachers	25	42	17
Classes	25	84	59

Eligibility Criteria

- In recent years, the 18 lowest scoring applicants to each class were selected for the Prekindergarten Program. This year any low-income, four-year-old or limited-English-proficient (LEP) child living in the school's attendance area was eligible to enroll. This permitted some above-average children to participate as well as low-achieving children. LEP students are those students with a home language other than English who are of limited English proficiency.

Bilingual and ESL Classes

- The change in eligibility criteria and the increased number of classes also resulted in more classes for LEP students. There were 34 bilingual and 14 English-as-a-second-language (ESL) half-day classes in 1986-1987 compared to only 6 full-day bilingual classes last year.

AISD'S PREKINDERGARTEN CURRICULUM

The Austin Independent School District's Prekindergarten Program was recognized in 1985 with an award by the Secretary of Education. The program was cited for its documented student achievement test performance; well-planned, formal, systematic evaluations; and repeated success rate of the children. From its inception, the Prekindergarten Program has emphasized oral language development which includes concept development and vocabulary enhancement.

The state, through H.B. 72, describes the essential elements for prekindergarten programs. AISD's locally written curriculum includes the state essential elements through such important ideas as the following:

- Expanding children's language.
- Providing many opportunities for children to share and describe.
- Sharing good children's literature including folk tales, nursery rhymes, and poetry.
- Offering children opportunities to participate in music, art, and theatre arts activities.
- Developing children's fine and gross motor skills.
- Teaching science skills.
- Teaching social skills including appropriate classroom and small group behaviors.
- Teaching pre-arithmetic concepts and skills in informal ways.
- Introducing social studies, science, and health concepts.

WHO WAS SERVED BY THE PREKINDERGARTEN PROGRAM THIS YEAR?

The expansion of the program produced slight changes in some demographic characteristics of participants.

Ethnicity

- Asian and Anglo/Other participation increased 4.8 and 7.8 percentage points respectively from last year while Black and Hispanic participation decreased 7.4 and 5.0 percentage points each.

Low-Income Status

- There was a slightly higher percentage of students from low-income households in 1986-1987, as determined by eligibility for the federal lunch program.

Limited-English-Proficient (LEP) Children

- About one fourth of the prekindergarten children both years were Spanish-speaking LEP children. LEP children who speak other languages (Other-LEP) increased 3.5 percentage points, from .2% in 1985-1986 to 3.7% this year.

FIGURE 2
DEMOGRAPHIC PERCENTAGES OF PREKINDERGARTEN PARTICIPANTS

Demographic Characteristic	1985-86		1986-87	
	Number	Percent	Number	Percent
Ethnicity				
Black	175	35.4	425	28.0
Hispanic	301	60.9	848	55.9
Asian	2	0.4	79	5.2
Anglo/Other	16	3.2	164	10.8
Sex				
Male	244	49.4	732	48.3
Female	250	50.6	784	51.7
Low Income	346	76.7	1,299	85.7
Limited-English-Proficient				
Hispanic-LEP	134	27.1	379	25.0
Other-LEP	1	0.2	56	3.7
Non-LEP	359	72.6	1,081	71.3

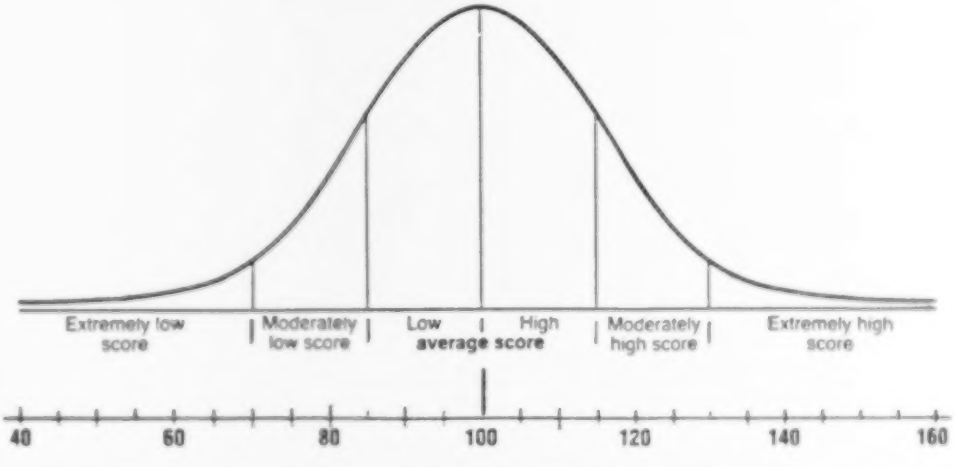
THE PEABODY PICTURE VOCABULARY TEST-REVISED (PPVT)

The PPVT-R is described by its publisher as "designed primarily to measure a subject's receptive (hearing) vocabulary for Standard American English. In this sense, it is an achievement test, since it shows the extent of English vocabulary acquisition."

The test is easy to administer even to very young, immature children. Each test is individually administered. The tester shows a student a page with four pictures and says a word. The student need only point to the matching picture.

Results are expressed in terms of standard scores. This allows an individual's score to be compared with a large group of persons of the same chronological age upon whom the PPVT-R was standardized. As illustrated below, a standard score of 100 is the national average. A score below 70 is described as "extremely low," between 70 and 85 as "moderately low," and between 85 and 100 as "low average."

Students making an average gain from pretest to posttest will receive the same standard score on each administration. A gain in standard score represents a gain in vocabulary that is greater than average. A basal is defined as the highest eight consecutive correct answers. Subjects who can not answer the first eight simplest items correct generally have scores too low to interpret.



HOW MUCH DID PREKINDERGARTEN STUDENTS ACHIEVE?

In order to examine whether or not the changes in program structure had any impact on student learning, the Peabody Picture Vocabulary Test-Revised (PPVT-R) was given to a random 50% sample of students enrolled in October, 1986. The same students were posttested in April, 1987 if still enrolled. Altogether, 613 students had pre- and posttest scores. However, a number of students did not score high enough on one or both tests to provide an accurate measure of vocabulary achievement. This lowered the number with pre- and posttest scores to 428. The results for 1986-87 were compared with those of participants with valid scores from 1985-86. Therefore, the results which follow are based on students who were able to score high enough to get a valid score. It is assumed, however, that those conclusions which apply to the lowest scoring among these students would also apply to those without valid scores.

Two questions were investigated:

1. Did the program have a positive impact on student achievement?

2. Did the change from a full-day to a half-day program significantly affect student achievement gains?

Program Impact

On the PPVT-R, a student making normal growth would have the same score on both the pretest and posttest. Therefore, any gain in mean score from October to April is a gain in vocabulary achievement which exceeds the gain normally made by students of the same age. AISD prekindergarten students once again showed impressive gains in standard score. Figure 3 shows the average gains for 1985-86 and 1986-87. Scores are reported separately for LEP and non-LEP students because analyses showed that the achievement results were different for these two groups. The gains in 1986-87 were approximately two-thirds those of the previous year.

FIGURE 3
AVERAGE PPVT-R STANDARD SCORES BY YEAR
FOR LEP AND NON-LEP PREKINDERGARTEN STUDENTS

GROUP	SAMPLE SIZE	PRETEST	POSTTEST	GAIN
LEP				
1985-1986	28	70.0	85.5	15.5
1986-1987	94	67.7	78.8	11.4
NON-LEP				
1985-1986	183	73.2	89.0	15.8
1986-1987	334	79.7	90.6	10.9

REGRESSION ANALYSIS--READING FIGURES 4 AND 5

Sometimes comparing average gains made on tests by different groups provides only a limited understanding of an instructional program's impact on children's achievement. For example, a simple comparison of average scores does not reveal that the Prekindergarten Program has a greater impact on low-scoring students than on their higher achieving peers. To find this kind of relationship, ORE uses a series of regression analyses.

The graphs in Figures 4 and 5 are part of the output of these analyses. They show plots of lines called regression lines which best describe the relationship between pre- and posttest scores for the two groups of students under consideration. Each figure has two regression lines--a "dot-dashed" line for full-day classes and a "dashed" line for half-day classes. The third line shows the national average. The length of each line is determined by the range of pretest scores for the group.

As an example of how to read the graphs, find the pretest score of 35 on the horizontal axis. Go up from that point to the top line, the dot-dashed line for full-day classes. Reading horizontally on the vertical axis, you find a posttest score of about 68. The average student in a full-day class who had a pretest score of 35 scored 68 on the posttest. If you read the posttest score for a half-day student (dashed line) with a pretest score of 35, the result is about 62 which is 6 standard score points below the full-day student's score (68 - 62 = 6). Note that the posttest of the half-day student is 27 points higher than the national average (62 - 35 = 27).

The regression lines for full-day and half-day students in Figure 4 are parallel. This means that the six-point difference between the two groups is constant across the entire range of pretest scores. However, the difference between each regression line and the solid line representing the national average decreases with increasing pretest scores. The two regression lines intersect the national average line at pretest scores of about 88 for half-day classes and 100 for full-day classes. Students with pretest scores greater than these values had average gains that were smaller than the national average. To summarize, the higher the line, the higher the average posttest score on the PPVT-R. Whenever one group's line is above another group's line, the students in the top group have higher posttest scores than students with the same pretest scores in the other group.

Figure 5 presents a more complicated picture because the regression lines are not parallel. The two lines intersect at a pretest score of about 80. This means that at pretest scores below 80, full-day students performed better on the posttest than similar half-day students; however, at pretest scores above 80 the reverse tended to be true.

FIGURE 4
PLOT OF REGRESSION LINES FOR FULL-DAY AND HALF-DAY
PREKINDERGARTEN PROGRAMS FOR LEP STUDENTS

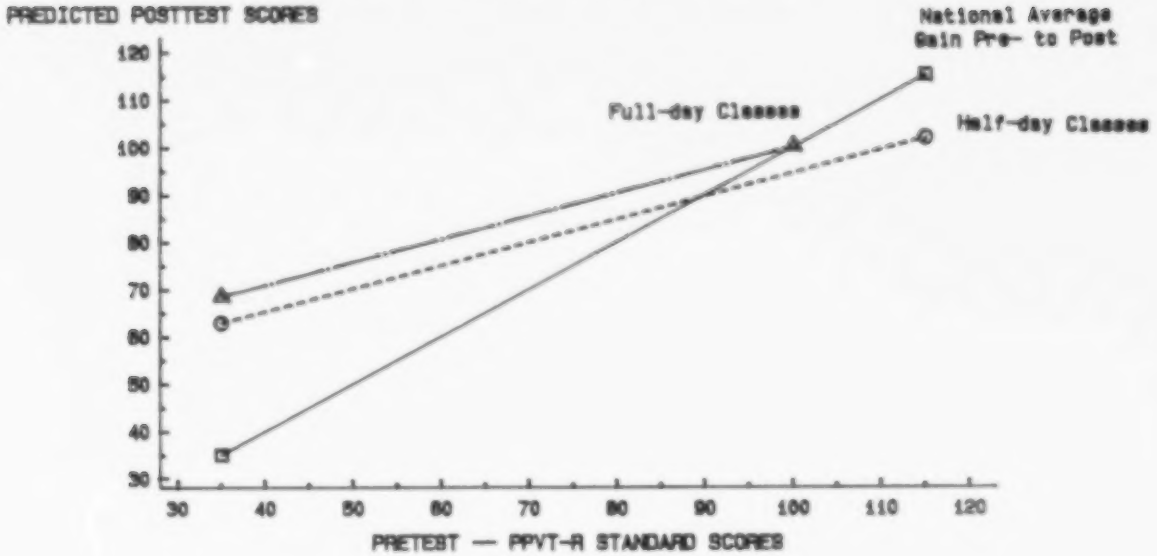
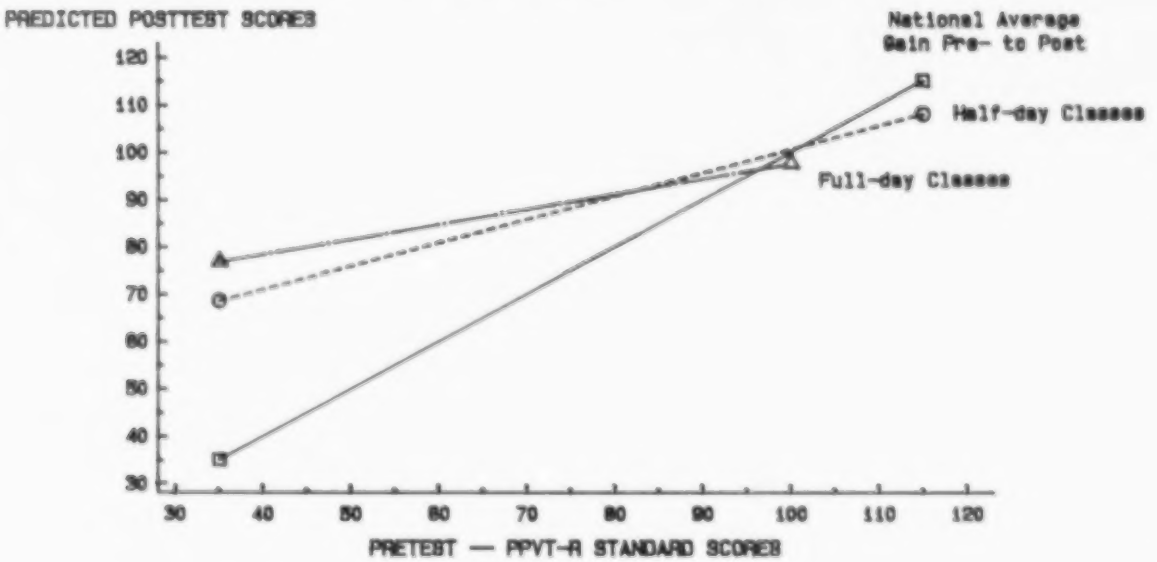


FIGURE 5
PLOT OF REGRESSION LINES FOR FULL-DAY AND HALF-DAY
PREKINDERGARTEN PROGRAMS FOR NON-LEP STUDENTS



However, the average scores do not tell the whole story. Figures 4 and 5 reveal that for both years lower-scoring students on the pretest made much larger gains than students scoring at higher levels. Note that for each group the vertical distance between the regression line indicating the predicted posttest score and the line representing the gain of an average student nationwide decreases at higher levels of the pretest.

The differences are more easily seen in Figure 6 which provides gains for students at various pretest levels. For AISD students with pretest scores near the national average of 100, the regression analyses show small gains from attendance in our Prekindergarten Program. However, students with extremely low scores make much larger gains. Figure 7 shows the difference in gain for 1985-1986 and 1986-1987 to illustrate that for LEP students the differences are similar across pretest levels whereas for Non-LEP students the differences get smaller the higher the pretest level.

In summary, the AISD Prekindergarten Program continues to produce greater than expected gains for participants, particularly for students who score at very low levels in vocabulary achievement upon entry (e.g., at the 1st percentile or below).

Half Day vs. Full Day

Figures 4-5 also illustrate the differences between the half-day and full-day programs. Regression analysis showed significantly better performance by full-day LEP students across all ranges of the pretest. As illustrated in Figure 6, full-day participants in 1985-86 scored 5-6 points higher on the posttest than half-day participants of the same pretest level.

For non-LEP students the advantage of participation in the full-day program was not uniformly positive. The difference was greater at lower values of the pretest than at higher levels. Note (from Figure 6) that while full-day students outscored half-day participants by 7 standard score points at a pretest level of 40, the difference between the groups was 0 at a pretest score of 80 and tended to favor half-time students above that level.

FIGURE 6
REGRESSION-BASED PPVT-R GAINS AT
FOR STUDENTS AT VARIOUS PRETEST LEVELS

	PRETEST LEVEL					
GROUP	40	50	60	70	80	90
LEP						
1985-1986	31	26	21	15	10	5
1986-1987	25	20	15	10	5	0
NON-LEP						
1985-1986	38	32	25	18	11	4
1986-1987	31	26	21	16	11	6

FIGURE 7
DIFFERENCES BETWEEN REGRESSION-BASED PPVT-R GAINS FOR FULL-DAY AND HALF-DAY CLASSES AT VARIOUS PRETEST LEVELS

GROUP	PRETEST LEVEL 40	50	60	70	80	90
LEP						
Difference	6	6	6	5	5	5
NON-LEP						
Difference	7	6	4	2	0	-2

Morning vs. Afternoon: Two other issues associated with the half-day/full-day question were investigated. The first was whether there was any difference between the achievement gains made by students in the morning or afternoon classes. The concern had been raised that fatigue would reduce the amount students would learn in the afternoon classes.

While there was a slight tendency at the extremes for both higher and lower achieving non-LEP children to gain more in the morning session, there was no overall difference of any practical significance between morning and afternoon sessions. LEP children did not show any tendency for a difference between morning and afternoon classes, even at the extremes. Figure 8 provides the pretest, posttest, and gain scores for both groups.

FIGURE 8
AVERAGE PPVT-R SCORES BY AM/PM SESSION FOR LEP AND NON-LEP PREKINDERGARTEN CHILDREN

GROUP	SAMPLE SIZE	PRETEST	POSTTEST	GAIN
LEP				
Morning	47	68.4	78.6	10.1
Afternoon	51	70.0	80.1	10.1*
NON-LEP				
Morning	157	78.7	90.0	11.3
Afternoon	173	81.0	91.5	10.5*

* Differences between sessions not statistically significant.

New Teachers vs Experienced Teachers: The other question was whether or not the differences might be due to greater average experience on the part of the teachers in 1985-86. Forty-eight percent of this year's teachers did not teach in the District's Prekindergarten Program last year.

For non-LEP students the results were straightforward. Regression analysis showed that there was no statistically significant difference in the average gains of students taught by the two groups of teachers. See Figure 9.

FIGURE 9
AVERAGE PPVT-R SCORES BY TEACHER EXPERIENCE
FOR NON-LEP PREKINDERGARTEN CHILDREN

GROUP	SAMPLE SIZE	PRETEST	POSTTEST	GAIN
New Teacher	166	81.8	91.9	10.1
Experienced	164	78.1	89.7	11.6*

*Difference between groups not statistically significant.

The results for LEP students call into question the finding that the full-day program is superior to the half-day program for LEP students. As Figure 9 shows, the gains for LEP students taught by experienced teachers were greater than those with new teachers. Therefore, to better understand the results, the scores of LEP students served in 1985-86 were compared with the scores of this year's students taught by the experienced teachers. This comparison was made in order to estimate the impact of the change to a half-day program with the influence of the new teachers removed. The result was that the two groups did not differ. That is, the observed difference in the half-day and the full-day program for LEP students may be more the result of teacher experience than the length of the instructional day.

FIGURE 10
AVERAGE PPVT-R SCORES BY TEACHER EXPERIENCE
FOR LEP PREKINDERGARTEN CHILDREN

GROUP	SAMPLE SIZE	PRETEST	POSTTEST	GAIN	
FULL-DAY	28	70.0	85.5	15.5	**
HALF-DAY					
New Teacher	37	67.3	75.5	8.2	*
Experienced	57	67.5	80.9	13.4	*

*Difference is statistically significant.
**Difference is not statistically significant.

Such a finding seems to run counter to common sense, especially given the difference observed for non-LEP students. Did the experienced teachers adjust their teaching in some way in order to produce the same gains with only 60% of the instructional time? If so, they should share what they did with others. Was the difficulty in finding bilingually certified early childhood teachers a factor? Informal reports indicate that some of the new teachers were hired on an emergency permit.

However, the result may be spurious. Sometimes findings occur which cannot be replicated because they are the result of unique characteristics of the students or unique circumstances in the classroom or in the testing situation. Whatever the case, this finding casts a shadow of doubt on the conclusion that LEP students benefit more from a full-day program. However,

if the Prekindergarten Program is implemented as planned in 1987-1988, the opportunity will exist for further investigation because both full-day and half-day classes will be offered.

HOW DID ATTENDANCE IN HALF-DAY AND FULL-DAY CLASSES COMPARE?

Using the District's attendance files, it was possible to count the number of days enrolled, absent, and attending class for all prekindergarten students this year and last. The attendance rate, i.e., days attending divided by days enrolled, was 92.5% for 1985-86 and 89.6% for 1986-87. For a class of 18, the observed differences in attendance rates would be about half-a-child per day. To put it another way, the difference of three percentage points is equal to a difference of five days in a 175 day school year.

Although the attendance rate for both years is similar, children in the half-day program were enrolled an average of 15 fewer days.

FIGURE 11
AVERAGE ATTENDANCE FOR PREKINDERGARTEN STUDENTS BY YEAR

SCHOOL YEAR	ENROLLED	ABSENT	IN CLASS	ATTENDANCE RATE
1985-1986	153.7	11.6	142.1	92.5
1986-1987	138.5	14.4	124.1	89.6

HOW MUCH DID PREKINDERGARTEN COST THIS YEAR?

The Budget For The Year 1986-1987 listed allocated budgeted amounts for this year's Prekindergarten Program as $93,040 for administration and other costs. Teacher salaries are estimated as $1,260,000. Bus transportation costs were budgeted as $682,861 bringing the total budget costs for AISD to $2,035,901. The cost per prekindergarten student is $1,343 when 1,516 students are served. Assuming three hours of contact per day and an average of 138.5 days at school per child, the cost per student contact hour for a year is $566. Assuming there are six instructional hours per student full-time-equivalent (FTE), the cost per student FTE for a year is $3,396.

CONCLUSIONS

Should this year's policy of half-day classes be continued? On one hand, average gains this year were about two thirds of last year's. On the other hand, about two thirds of the children, the ones who scored higher and closer to PPVT's mean, had an average gain essentially the same as last year's full-day program. Furthermore, three times the number of children were served this year. If three times the number of children can make two-thirds the vocabulary gains of those made in a full-day program, would this not have greater value?

One approach is to create a measure of the productivity of the teachers each year by multiplying the average standard score gain by the number of students and dividing by the number of teachers. If that is done, in 1985-86 the average teacher produced 311 units of standard score gain compared with 397 units on the average in 1986-87. Therefore, the half-day program was about 28% more productive than full-day classes. This is obviously an approach that makes many assumptions and should raise many questions for discussion.

So what are the more straightforward conclusion that can be reached? Remembering that the PPVT-R measures only one of many important expected outcomes of prekindergarten, one can conclude that...

1. Half-day Prekindergarten Program gains in English vocabulary are generally about two-thirds those of the full-day program.

2. The greater gains of the LEP students in a full-day program occur at all levels of achievement; however, the difference appears to be associated more with teacher experience than the amount of instructional time.

3. For non-LEP students, the difference is greatest for lower achieving students and tends to disappear for these students with a pretest score greater than about 80.

4. There is little if any difference in the achievement gains of students in morning or afternoon classes, and

5. Half-day classes may lead to somewhat lower attendance rates.

It appears that full-day prekindergarten classes might be targeted where possible to LEP children and those non-LEP students with the lowest achievement levels. Higher achieving children would probably not be as impacted by the increase in instructional time.

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